Sustainable development and and academic institutions: issues in interdisciplinary learning

Working Paper Number 26/Document de travail 26

SUSTAINABLE DEVELOPMENT AND ACADEMIC INSTITUTIONS: ISSUES IN INTERDISCIPLINARY LEARNING

Education Task Force, NRTEE
and
Sustainable Development Research Institute,
University of British Columbia

March 1995

For comments or copies please contact:

National Round Table on the Environment and the Economy (NRTEE)

1 Nicholas Street, Suite 1500
Ottawa, Ontario, K1N 7B7
Ph: (613) 992-7189 Fax: (613) 992-7385

pour commentaires ou exemplaires contacter:

Table ronde nationale sur l'environnement et l'économie (TRNEE)

1, rue Nicholas, bureau 1500
Ottawa, Ontario, K1N 7B7
Tél: (613) 992-7189 Fax: (613) 992-7385

NATIONAL ROUND TABLE WORKING PAPER SERIES / SÉRIE DE DOCUMENTS DE TRAVAIL DE LA TRNEE

1 Prosperity and Sustainable Development for Canada: Advice to the Prime Minister

Développement durable et prospérité : Recommandations au Premier ministre

by/par Ronald L. Doering and David Runnalls

2 The Financial Services Industry and Sustainable Development: Managing Change, Information and Risk

by J. Anthony Cassils

3 Lender Liability for Contaminated Sites: Issues for Lenders and Investors

by Ernst & Young

4 Market Correction: Economic Incentives for Sustainable Development

by Mike Kelly

5 Environmental Regulations and the Canadian Pulp and Paper Industry: An Examination of the Porter Strategy

by Ronald L. Doering, François Bregha, Don Roberts, Steve Thompson and Dave Wilson

6 Environmentally Perverse Government Incentives

by Philippe Clément

7 Environmental Impact Assessment and Competitiveness

by Nancy Morgan, Martin Palleson and A.R. Thompson

8 Emerging Trends and Issues in Canada's Environmental Industry

by Anne Fouillard

10 Trade, Competitiveness and the Environment

Commerce, compétitivité et environnement

by/par David Runnalls and Murray Smith

11 Sustainability and Prosperity: The Role of Infrastructure

by Daryl Fields and Jack Ruitenbeek

12 Measuring Sustainable Development: Energy Production and Use in Canada

by Western Environmental Trends, Inc. (W.E.S.T.)

13 Exploring Incentives: An Introduction to Incentives and Economic Instruments for Sustainable Development

Revue des stimulants : Introduction aux stimulants et aux instruments économiques pour le développement durable

by/par J. Anthony Cassils

14 Canadian Round Tables on the Environment and the Economy: Their History, Form and Function

Les tables rondes Canadiennes sur l'environnement et l'économie : Leur historique, leur organisation et leur rôle

Mesas Redondas Celebradas en Canada sobre el Medio Ambiente y la Economia : Historia, Forma y Función

by/par/por Ronald L. Doering

15 Reporting on Sustainable Development in Support of National Decision-Makers

by François Bregha, John Moffet and Vic Nishi, Resource Futures International

16 Reporting on Sustainable Development: The Municipal and Household Level

by Dr. Trevor Hancock

17 Corporate Sustainable Development Reporting in Canada

by David Nitkin and David Powell, EthicScan Canada

18 Aperçu national sur la planification stratégique du développement durable dans les provinces et les territoires du Canada

par Philippe Clément

19 Canada's Agricultural and Trade Policies: Implications for Rural Renewal and Biodiversity

Politiques agricoles et commerciales du Canada : Répercussions sur le renouveau rural et la biodiversité

by/par Robert Sopuck

20 Linking Land Titles/Registry Systems in Canada to Land-Related Environmental Information

by J. Anthony Cassils

21 Renouvellement du cadre d'imputabilité du gouvernement dans le développement viable : Rôle possible d'un Commissaire ou Vérificateur à l'Environnement

A Renewed Framework for Government Accountability in the Area of Sustainable Development: Potential Role for a Canadian Parliamentary Auditor/Commissioner for the Environment

by/par François Bregha and Philippe Clément

22 Media, Fish and Sustainability: A Paper on Sustainable Development and the Canadian News Media

by Michael Keating

23 Harvesting Methods in Canada's Forests: A Discussion Paper

Méthodes de coupe du bois dans les forêts Canadiennes : Document de travail

by/par Steve Thompson

24 Municipal Reporting on Sustainable Development: A Status Review

by R. Douglas Burch

25 Sustainable Development as a Focus for Canadian Foreign Policy

by John Kirton

26 Sustainable Development and Academic Institutions: Issues in Interdisciplinary Learning

27 Exploring Barriers to Sound Environmental Practices

by J. Anthony Cassils

28 Environmental Taxation, Revenues, and Effectiveness: The Need for Principled Guidance

by Robert J.P. Gale

29 Principles for the Sustainable Development of Pulp and Paper Products: A Report from the Pulp and Paper Round Table

Principes de production viable des produits de pâtes et papiers: Rapport de la Table ronde sur les pâtes et papiers

prepared by/publié sous la direction : Steve Thompson and Sarah Shadforth

30 After Rio: The Question of International Institutional Reform

Après Rio : Le problème de la réforme institutionelle

by/par The Honourable Maurice Strong

Table of Contents

Introduction

The Education Task Force of the National Round Table on the Environment and the Economy (NRTEE) aims to fulfil the goals set by the World Commission on Environment and Development (and by the action agenda from the United Nations Conference on Environment and Development) recognizing education as an important tool for achieving a sustainable future.[1] The Task Force has been involved in a number of initiatives in both formal and informal education since its creation in 1989. Two national initiatives are Learning for a Sustainable Future, a project to create a sustainable development education program for Canadian primary and secondary schools, and in partnership with ParticipACTION, SustainABILITY, a national social marketing program developed to facilitate changed attitudes, values and behaviour in the general public.

The Education Task Force convened a meeting in Toronto in February 1994 that brought together 21 representatives of Canadian university teaching programs (see appendix I). The objectives of this workshop were to stimulate discussion on how environmental and sustainable development education can be effective in a university context; to discuss issues facing those involved in environment and sustainable development education as identified by participants in a pre-workshop assessment; and to determine what role the NRTEE might play in integrating sustainable development into university education. The participants, representing well-established programs and those just under development, looked at issues such as identifying sustainable development core curricula and the need for networking and outreach within and outside the university. A Statement of Common Principles for Interdisciplinary Environment and Sustainable Development Education and Research Programs in Post-Secondary Institutions was also drafted as a result of the workshop (see appendix II).

The workshop was a second phase of academic outreach for the Education Task Force. Prior to this, together with the International Institute for Sustainable Development (IISD) in Winnipeg, the Task Force hosted a workshop in Ottawa March 13, 1993, that brought together 11 representatives from sustainable development research institutes and centres across Canada (see appendix III). The participants discussed common barriers and challenges and unanimously agreed to continue meeting as the Canadian Centres for Sustainable Development Research (CCSDR).[2] The group met again in Vancouver in October 1993 to discuss its role and workplan for the first year. Members subsequently agreed to promote collaboration between their respective institutes; promote the necessity for sustainable development research within universities and the wider community; and to foster links and greater collaboration with government, industry and non-governmental organizations.

This report presents an overview of post-secondary environment education in Canada and highlights the issues and recommendation identified by teaching faculty in workshop discussions and telephone interviews conducted in advance of the workshop.

Background

The history of university environmental education in Canada started 25 years ago when York, Waterloo and Calgary established faculties of environmental studies during the early days of the environment movement. These programs were staffed by individuals from a wide range of backgrounds which provided opportunities for interdisciplinary education and teaching.

Formal international recognition of the importance of environmental education began in the 1970s, first at the 1972 United Nations Conference on Human Environment in Stockholm, which called for the creation of an International Environmental Education Program (IEEP).[3] This was followed by 1972 and 1974 Organization for Economic Cooperation and Development (OECD) seminars on university environmental education in France and Denmark; and a United Nations Education, Science and Cultural Organization (UNESCO) and United Nations Environment Program (UNEP) workshop in Belgrade in 1976. [4]

UNESCO then helped organize the 1977 Intergovernmental Conference on Environmental Education in Tblisi, in the then USSR. [5] The Tblisi conference worked at defining the nature of environmental education which "should help make education systems more relevant and more realistic and to establish greater interdependence between these systems and their natural and social environments..."[6] In addition, the Conference recognized that environmental education represented an interdisciplinary approach and was not just an extra subject to be added on to the existing curriculum. A set of goals for environmental education was produced: to foster clear awareness of, and concern about, economic, social, political and ecological interdependence in urban and rural areas; to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment; and to create new patterns of behaviour in individuals, groups, and society as a whole toward the environment.[7]

Following Tblisi, UNESCO and the International Association of Universities (IAU) sponsored a seminar on the responsibility of the University Toward the Natural and Cultural Environment in Lome in 1979, and a seminar on the Role of the University in Environmental Education in Budapest in October 1983. [8]

With the release of the Brundtland Report in 1987, discussion about environmental education began to focus on sustainable development education and more broadly on the role that universities could play in integrating environmental issues into various aspects of academic institutions and operations. In 1990, the president of Tufts University brought together 22 university presidents from 13 countries - mostly developing - together at a meeting in Talloires France, to discuss the role of universities in environment and development research and teaching. The resulting Talloires Declaration has been signed by 125 university presidents from 32 countries. The Declaration looks at the incorporation of environmental literacy in universities; ways to encourage outstanding scholars to engage in research and education on environmental issues; ways to change tenure and promotion requirements; and ways to encourage

multidisciplinary thinking. [9]

Following the Talloires meeting and six months before the United Nations Conference on Environment and Development (UNCED) in Rio, Dalhousie University hosted a conference in December 1991. University presidents from a number of countries were joined by representatives from government, industry, non-government organizations, faculty and students to examine further the issues raised by the Talloires Conference and consider the role that universities could play at UNCED. The resulting Halifax Declaration provides a general direction for universities to follow in response to environmental and developmental issues and a follow-up action plan sets out practical strategies for sustainable development. The rationale is that "the educational, research, and public service roles of universities enable them to be competent, effective contributors to the major attitudinal and policy changes necessary for a sustainable future". [10] Guelph University also hosted a workshop on "The Role of a University in a Sustainable Society" in May 1992.[11]

Overview of University Environmental Education in Canada

Canadian post-secondary environmental studies and science programs and activity have grown dramatically in that last few years, as evidenced by the formation, in November 1993, of the Environmental Studies Association of Canada (ESAC), a new learned society dedicated to the encouragement of research and publication in, teaching and general development of, and activities related to, environmental studies. As ESAC notes "environmental studies has become an important area of scholarship and research addressing social, cultural, ecological, economic, political, psychological, historical, philosophical, aesthetic, legal, scientific, and religious aspects of environmental issues".[12]

In addition, the new Canadian Council for Human Resources in the Environment Industry (CCHREI) is an industry initiated and led, not-for-profit Canadian corporation with a mission "to ensure an adequate supply of people with the appropriate skills and knowledge to meet the environmental needs of the public and private sectors".[13]

Sustainable development and environmental education at post-secondary academic institutions in Canada is represented by a wide range of courses and programs, in both their emphasis and curriculum, as well as their internal organization and structure. These differences in themselves also help to highlight some of the issues in environmental education and in some cases may provide a framework for understanding what type of program will work where and when. This may be particularly informative for programs that are still under development, or which may only be at the idea stage. Sustainable development education specifically tends to be represented by more courses and material raised in courses than by discrete programs.

The following is a rough breakdown of 39 Canadian programs, some under development, identified for the NRTEE teaching programs workshop. Although many individual faculty members are doing research, teaching courses and supervising students in these areas, they are more difficult to identify than those teaching in discrete programs. These numbers, therefore, do

not necessarily reflect the full penetration of university environmental and sustainable development education. In addition, given the proliferation of new programs, it is expected that these numbers will change over time. Although a more comprehensive study would be required for detailed and accurate information these tables should give a rough breakdown of what is available and under development.

Table I. Breakdown of Programs by Degree Type

	BSc[1]	BA	BSc or BA	Specialized[3]	TOTAL	PhD	Post Bacc.
	MSc[2]	MA	Msc or MA	Env. Degree			Diploma
Undergrad	7	2	13	5	27	—	4
Graduate	5	1	4	7	17	5 of 17	—

Notes: 1. The BA's and BSc's include honours degrees; major; joint majors; and minors
2. It is recognized that many academic faculty across Canada are doing environmental and sustainable development work in their home departments that is not necessarily reflected by any of these programs, and are advisors for students doing MA's and MSc's in environmental studies and sciences and sustainable development. These numbers refer only to distinctive programs that could be easily identified.
3. These include BES, BNRS, BED, MES, MRM, MNRM, MED, etc.

Table II. Breakdown of Available Programs by Primary Orientation

	Science	Arts	Either/Prof. Environ.
Undergrad	12	2	13
Graduate	9	1	7

Table III. Breakdown of Programs by Organizational Structure

	Institute	Faculty	Depart/School	Program	New (est.1991 or earlier)
Undergrad	2	3	9	13	at least 10 of 27
Graduate	3	1	7	5	4 of 17

Table IV. A Sample of Demand for Programs in 1993

Graduate Programs

	Applicants	Accepted	Total Registered	Graduated
SFU	245	27	90	--
U. of Calgary	136	18	--	12
Dalhousie	197	27	--	12

Undergraduate Programs

	Applicants	Accepted/ Registered	Graduated
Guelph (BSc)	675	120	--
Brock	--	Total: 241 Certificate: 3 Env. Science: 78 Combined Majors: 160	--
McMaster Env. Science	--	Y2: 11 Y3:9 Y4:10	6
McMaster Env. Studies	--	Y2: 8 Y3:8 Y4: 11	3

As seen from the above tables, the bulk of environmental education, in Canada is still being offered by science faculties and departments. Yet the greatest challenge of interdisciplinarity, particulary true for environmental issues, may be bridging the gap between the "sciences" and the "arts" although in the case of the environmental studies professional practice programs, this challenge is either largely met, or not relevant. Moreover, the gap in ways of knowing and thinking is not only present between the natural and human sciences but also within them, between disciplines such as geology and biology, entomology and ornithology, sociology and political science, law and economics. Many environmental science programs at both the

undergraduate and graduate level are managing to bridge the gap somewhat by offering courses for non-science students as well as ensuring that science students have exposure to the political, economic, social and philosophical aspects of environmental problems.

One of the opportunities presented by this current rapid growth of university environmental programs is the impetus to meet at workshops such as the one sponsored by the NRTEE to discuss just what environmental and sustainable development education means at different universities and in different programs. It is perhaps the nature of much interdisciplinary work to defy definition and pinning down (which is probably desirable to some extent). The rather amorphous image of interdisciplinary environmental studies to date has sometimes not made it easy for faculty members to gain support from colleagues for the teaching and/or research they are doing. Part of this image issue has had much more to do with the breadth of material by encompassed environmental education, leading to the perception that the field is " undisciplined". Rather, the subject area is just inherently much broader than traditional disciplines. This breadth also frequently provides a unique opportunity and advantage for individual faculty to explore their interest and alternate approaches to university education.

Various provincial initiatives to promote or survey environmental education and clarify its aims have been established recently. For example, the Nova Scotia Round Table on the Environment and the Economy published a report in February 1993 on the role of formal education in sustainable development and the environment.[14] The committee made a number of recommendations and suggested that the aims of environmental and sustainable development education at the university/college level should be to:

- foster a general awareness and sensitivity about the environment that will assist students in developing their own ethic regarding the environment and sustainable and equitable development;
- encourage the application of this ethic within a discipline or profession; and
- develop specialists capable of working with multi-disciplinary groups to solve problems relating to the environment and sustainable development.

The first of these aims has to do with general environmental education, including that for students not registered in an environmental studies or science program. The latter two goals relate to the professional practice environmental studies programs.

A 1993 report for the Council of Ontario Universities found that, at least in Ontario, the basic need seems to be for a better balance or mix of specialized and contextual knowledge, including alternatives in curricula, scheduling and practical problem-solving projects.[15] The report concluded with recommendations for careful reviews of the idea of sustainable development and its implications for Ontario universities at the system, university, faculty and departmental levels. It recommends that more attention and consideration be paid to continuing education and scheduling changes to allow greater access through intensive short courses, independent studies and problem-solving experiences; and in university building programs, attention should be given to the off-campus alternatives of renovating existing space in downtown areas.

Issues in University Environmental and Sustainable Development Education

The following points highlight many of the key issues in post-secondary environmental and sustainable development education in Canada as identified by teaching faculty in telephone interviews and during workshop discussions.

1. Distinction between environmental studies, environmental sciences and sustainable development education

First, an important distinction exists between environmental sciences and environmental studies; and the issues and/or problems of one are not necessarily common to the other. For example, there is a question of how much science to teach environmental studies students who are focusing on the social sciences and humanities, and similarly, how much of the social sciences and humanities aspects should be required of environmental sciences students. Some programs do not enforce or formally recognize the distinction at all, rather, they present an interdisciplinary alternative that introduces students to all relevant areas of environmental or sustainable development education but does not provide specialization. Although there is probably little doubt that there is a significant difference between environmental studies and sciences, some science programs still carry the name "environmental studies".

Second, there is clearly a perceived distinction between sustainable development education and environmental education. Many people involved in environmental education either do not feel comfortable with the sustainable development terminology or very explicitly do not like it.[16] Some educators see a danger in painting this area of education with a sustainable development brush because they see it as an exclusive term involving power; and their concern is that those who are already in power will get to define what the term - and the curriculum - means.

What is critical, however, is not so much to debate the various definitions and interpretations of the term "sustainable development" but rather to understand how and why "environmental" and "sustainable development" education are different. That is, does sustainable development education involve something entirely independent of environmental education, or can they both fit within the existing and perhaps rapidly expanding regime? Some view environmental education as broader than sustainable development education but that the latter can fit within environmental studies/sciences. Sustainable development education may be one conception of environmental studies/sciences. Others, however, see it the other way around: sustainable development education is broader than environmental education; for examples, issues such as poverty, equity and international development education may not share the traditional problem solving orientation of environmental studies/sciences. It has been suggested that the distinguishing features of a sustainable program are the emphasis on process and institutional change and the focus on restoration, recovery and the future. In any case, it is argued that since government and industry are equally going to need help with the sustainable development agenda they have adopted, it would be good strategy for the academic community and teaching programs to be ready for this unique opportunity to respond to this challenge.

2. Interdisciplinarity

One of the primary distinguishing characteristics of environmental education is its grass-roots interdisciplinary (or "not-discipline-specific") nature. As the Tbilisi Declaration on Environmental Education noted, "the interdisciplinary approach seeks to find a more comprehensive and less cursory picture of the problems. It does not consist in juxtaposing different disciplines on an *a priori* basis but in grasping the process in its entirety and then proceeding to analyze and solve the specific problems"[17] But this interdisciplinarity raises some difficult issues as well as opportunities. The range of potential core knowledge in the environmental and sustainable development fields in itself presents a difficult issue for education. Some have argued that there can be no "core set" of academic content because there is just too much that could be included within that core set and that it is virtually impossible, within a standard four-year undergraduate degree to acquire a minimum degree of knowledge in every aspect of environmental material. How can this breadth and depth be defined and dealt with at the various levels of teaching programs?

Interdisciplinary environmental programs allow students a truly diverse selection of courses: they are not forced to make a choice on specialization early on and are not necessarily forced to make a "choice" at all if their interest ranges between the humanities, social sciences and natural sciences. although this flexibility and inclusiveness may much more closely reflect the world beyond the academic institution where environmental problems - and solutions - are manifested, the trade-off is loss of comprehensiveness, lack of specialization, and in some cases, lack of training in rigorous thinking. Finding solutions to many environmental and development issues around the world will still require the efforts and research of those who are highly specialized. One of the challenges for post-secondary education in this area is to strike an appropriate balance between flexibility and comprehensiveness.

In addition, there is some debate about the optimal level for interdisciplinary environmental/sustainable development education to take place. That is, some say that interdisciplinary work should only be permitted at the graduate level, after students have a strong disciplinary background or grounding in some specialization. Others argue for the value of interdisciplinary environmental studies or sciences at the undergraduate level. The latter programs seem to be proliferating in Canada most in the last few years. Many agree that the fourth year, undergraduate level, is early enough for interdisciplinary work.

3. Institutional support

The recent proliferation of new environmental studies and sciences programs and departments suggests a great deal of support for environmental education of which probably did not exist even ten years ago. Such institutional support for new environmental teaching programs is critical, particularly given the nature of alternative teaching methods and program design. This support goes beyond establishment of programs and allocation of existing faculty or the hiring of new members, and needs to include the recognition and understanding of department heads, deans,

and university administration that interdisciplinary environmental teaching (and research) fundamentally differs from traditional university teaching, and should be equally valued for that difference.

For example, faculty from other departments who are teaching extra courses in environmental programs may not be supported by their home departments or by their department colleagues and may be forced to juggle responsibilities and time required by their home department. The fact that a university has a sustainable development or environmental course program or even department, does not necessarily imply institutional support. Given that sustainable development and environment are currently popular "buzzwords", funds are more readily available for the environment; research jobs for environmental managers and scientists are frequently advertised; and there are often certain political advantages to presenting an image of taking the environment and the role of the university in this area seriously.[18]

There are three key variables which might determine institutional support: the presence of a funded program, degree-granting status and paid faculty. The relative presence of these variables may turn an ad hoc, loosely defined major or stream into a discrete and recognized program. And the organization of the program will determine the ease with which faculty can do interdisciplinary teaching and research. Interdisciplinary environmental education may also be more labour-intensive and may require more one-on-one contact between faculty and students that is generally the case with other undergraduate programs.[19]

The existing university reward structure involving recognition, jobs, publishing, promotion and tenure creates problems for those attempting environmental teaching and research. From the perspective of individual faculty members, there is little value in spending time teaching at the undergraduate level: publishing and fundraising are traditionally the valued contributions that a faculty member can make. Interdisciplinary work in general seems to be viewed by many in the university as somehow having a lower status and of less academic value. A statement from a dean or director, however, saying that one has to teach first year environmental studies attaches a high priority and recognition to this activity.

When faculty, especially younger, less-established members, undertake interdisciplinary environmental/sustainable development research or teaching, they incur considerable professional risk, primarily that their peer will not recognize their work as a significant activity, since the university culture rewards the achievement of individual excellence.[20] There is little precedent for assessing the group work that is common to multidisciplinary environmental research. More importantly, much of this difficulty in evaluation has to do with the fact that the reviewers are not able to evaluate the quality of the work. Perhaps an even greater reward structure problem than the "group vs. lone-wolf", is the distinction between disciplinary vs. interdisciplinary work. Traditionally, it has only been achievement in an individual, recognized discipline that leads to recognition and promotion, through publications in disciplinary journals. The challenge of peer review and evaluation of interdisciplinary research inherently challenges the existing academic system and creates reward problems, this is true for both graduate students and faculty research.

Three criteria have been suggested, however, as possibilities for environmental studies evaluation: does the research contribute to addressing real social and political problems; does the research contribute to the developmetnt of theories about the general interaction of human and natural systems; and is the research self-conscious about general epistemological critiques of disciplinarity?[21]

4. University structure

> "Sustainable development, when interpreted in the fullest meaning of the term, challenges the very educational mission of the university and forces us to re-examine the basic precepts of virutally every discipline within the unviersity. There is this fresh opportuntity to redefine not just curriculum but structure and underlying educational philosophy...[22]

New interdisciplinary environmental teaching programs are providing an oporturnity to develop - often- from scratch - innovative teaching and learning structures within the university that would be more difficult to introduce into exisiting and long-standing departments. Some of the characteristics of interdisciplinary environmental education such as experiential learing, team projects, and practical problem solving, might eventually filter into other university teaching as well.

But there are also some frustrations experienced working in an innovative, interdisciplinary program within the traditional university adminsitrative structure. Many feel that there is a problem in the university bureaucracy as a whole: simply put, "it's a dinosaur". For example, an environmental program may not meet university requirements for an honours undergraduate degree because of its interdisciplinary nature. As a result, it will offer a program that is effectively an honours program but classified as a major simply because it does not fit the traditional mold; this may be discouraging for the student who, for whatever reason, needs or wants an honours undergraduate degree. Students in interdisciplinary environmental programs also experience problems with rigid prerequisites and access to courses. Higher level disciplinary courses in economics, for example, will require a whole series of prerequisites which the environmental student will not have because of the diversity of their undergraduate program.

There are ways of getting around some of the administrative requirements of the university, however. For example, since flexibility is an important feature in this rapidly changing field, working groups, special topics and reading courses can respond quickly to change and be altered without getting approval.

The structure and organization of traditional teaching in fixed term-length courses and fixed terms is also a frustration for some environmental educators. An alternative is to provide uneven terms, course lengths such as a six-week course, a one-year course or intensive residential professional courses. In this or similar ways, the apprenticeship aspects of environmental education could be completed over a year or two. Various universities are experimenting with alternatives to self-contained departments; the fixed length of courses and terms; and methods of evaluation.

Decisions concerning the "administrative home" for the environmental/sustainable development program, the degrees offered, and the disciplines and faculty involved will depend on the individual constraints and opportunities in each university.

Interdisciplinary efforts require cooperation from a number of programs, departments and faculties where the interests of faculty and staff from diverse disciplines and programs must somehow coincide. But because of the traditional departmental structure, competition - often destructive - is more common, and more importantly, better understood and valued, than cooperation. And when fruitful interaction does occur, there may be no administrative structure for it to sustain itself. [23] There is a concern that if faculty teaching in environmental studies are returning to their home disciplines and departments for all their research, the interdisciplinary and practical, problem-solving aspect of environmental education will not trickle through to graduate level teaching and research.

Not only is the content and curriculum of environmental education different, but the entire process of interdisciplinary teaching and research is new, and in itself creates change which may be threatening to existing units occupied by faculty who may be very resistant to this change, whether it is for sustainable development and environmental education or anything else. In other words, the simplest reason for the significant opposition to sustainable development responses within academic institutions is the nature of academic conservatism and politics which resists change.[24]

"...the challenge for environmentalists/educators is to ensure that the political powers of narrow disciplinary interests do not override the ability of environmental courses to provide quality environmental education. It is apparent that environmental courses may not be retained by faculties simply because they are valuable to the community...Hence, an awareness of the socio-political structures within institutions, and of equivalent structures within the broader community, is necessary to avoid future disruption to environmental programs."[25]

5. Program organization

There is an issue about what structures of teaching, research, and institutional organization will result in the easiest and most interdisciplinarity. At the university level there is a spectrum of environmental teaching formats. For example, environmental education may be contained within a separate degree-granting department or faculty with its own courses, faculty, administration, and perhaps professional designation. In other places, environmental education involves several courses under the name "environmental studies" or "environmental sciences" or "sustainable development" and the rest of the student's program is a mix of courses from both sciences and the arts which the student may or may not be encouraged to integrate through seminars and projects. This is generally the case where a distinct program has been created without a new department or faculty. Students may be able to major or minor in environmental sciences\studies. Environmental education in still other cases involves an attempt to "apply the knowledge,

experience and techniques of an established scientific field to environmental problems" but without the interdisciplinary approach in teaching or research incorporated to any significant degree.

At the other end of spectrum, environmental education may include business-as-usual teaching of the established disciplines with either ad hoc or coordinated reference to environmental issues within existing and conventional courses. Although this might simply involve changing the words without much change in content, it might also involve a comprehensive introduction of environmental issues into a greater number of courses and perspectives. For example, some environmental educators believe that environmental education should not necessarily be contained within separate programs or departments at all, and, ideally, should be integrated more diffusely through existing disciplines and programs. Environmental and sustainable development education need not necessarily be confined to students who are registered in specific environmental programs or faculties but may consist of an uncontained program which would include basic environmental education for every student, regardless of their discipline.

Quality control may become an important issue here, however, since anyone could teach a course with some kind of environmental angle, and the question is then raised whether environmental educators want to be in the business of potentially putting themselves "out of business" by having environmental courses diffusely spread amongst various departments. This issue of quality control is relevant regardless of the type of program and it has been suggested that there should be reviews of the programs every five years to ensure that they are adequately responding to topical environmental issues. Alumni might be included on advisory bodies to provide input on what aspects of their education were relevant and what might have been lacking.

Alternatively, environmental studies and sciences programs might have a few courses open to all students, or environmental science courses open to non-science students. But although opening up environmental studies/sciences courses to students in other departments is one way important linkages could be built within the university, some feel that their courses are already overburdened with their own students and have no room for others. There is certainly no lack of demand from Canadian university students for environmental education. At universities where environmental studies/sciences courses were open to all first year students, the demand has been so high that courses have had to be cancelled because the demand outstripped the available resources.

The uncontained programs are seen to have a lot of value even though it is difficult to do them well. It has been suggested that the less contained a program is, the more necessary it is to have at least one full-time faculty member to work on the program. Students in uncontained programs may also find it difficult not having a home-base, but whether this affects the quality of their education is uncertain. One solution to this problem, as well as an invaluable networking tool, is to publish a booklet with the profiles of the students and faculty and their area of interest.

A few universities are also exploring the feasibility of making an environmental literacy component mandatory for every student to graduate. For example, an environmental science

course would be mandated for all first year students. However, this has raised queries about the academic freedom of mandating a course at the first year level. Some also doubt the feasibility of expecting faculty to want or be able to teach a course for perhaps 800 students. Mandating environmental courses would almost certainly require the dedication of extra faculty.

There is also a distinction to be made between students receiving interdisciplinary education, genuine interdisciplinary teaching programs, and faculty who are actually doing interdisciplinary teaching and research. These do not - at least presently - necessarily all happen at once or within the same institution.

6. Curriculum & Teaching

Environmental and sustainable developent education include a diverse range of topics, skills and concepts. The challenge in developing the curriculum is achieving the appropriate and most useful balance of the diversity.

> "The factual knowledge emphasized in the traditional scientific model of curriculum may help teachers and students address the empirical questions involved in environmental policy issues. However, environmental issues also invoke questions of definitions and values. A continued reliance on the empirical-analytical orientation to curriculum is likely to mean that the definitional and value judgements inherent in resolving policy issues will generally not be examined or will be inappropriately treated as representing objective (i.e., value-free), unproblematic solutions..."[26]

Although a "core" curriculum for university environmental studies and sciences may be difficult to identify or standardize in terms of content because of the breadth of potential material, there was much discussion among the NRTEE workshop participants about their ideas of the core courses and skills for environmental education, and a desire to reach some common understanding. For example, while environmental sciences, environmental studies, and the professional programs might have differences in terms of core content, they seem to share common curriculum objectives, such as a policy or project orientation, exploration, of environmental ethics, communications, interdisciplinary problem solving, and so on. The goal is to produce students who understand how both the natural world and society work. Students need to know how to think creatively and critically with values. Skills such as problem solving, data interpretation, communication, critical thinking and ethics are considered important as is an ability to adapt to change (because the skills will have to change over time).

One of the distinguishing characteristics of environmental education relative to most other university teaching is its applied, practical approach and emphasis on problem solving. Students are trained to use and apply whatever they are learning in their interdisciplinary curriculum to foster enhancement of the biosphere, which may include job skills in management or in scientific analysis, for example. To further this, teaching programs ideally should be experiential and participatory, involving team project work on and off campus. Student working groups can give

students a chance to network, exchange ideas and expertise, and collaborate on joint research ideas, particularly where a discrete faculty or department does not exist. It is even more important with interdisciplinary learning and structures that there be a mechanism for students to meet other students and have easy access to faculty. Some extra effort may be required by professors to provide advice, particularly since a difficulty with the joint programs is that advisors must be conversant with the prerequisites and required elements of all programs. Students will also often have very different curriculum concerns because of varying joint majors.

This problem-solving approach aims to make students aware of the obstacles to societal and planetary well-being, as well as provide them with the tools and skills to identify policy-relevant solutions. This is the key education aspect of recognizing the relationship between science and policy which sustainable development research makes explicit. It involves the recognition that science and academic research in general is not policy-neutral. One of the big problems with traditional university education has been that students emerge from an environment of very segmented information and are "confronted by a real world that never calls for the application of partial knowledge", leading to an inability to find solutions to problems. In environmental education, different aspects of knowledge ideally come together to provide an explanation of complex realities that is centred on a practical approach to environmental problems within the community, "as long as students are excluded from the sphere of social action, interaction between school and the community can only be superficial".[27] Cooperative options are an increasingly common way for students to combine education with practical, problem solving education off the campus.

Much of the background work in environmental education, including initiatives such as the NRTEE's *Learning for a Sustainable Future*, covers secondary and primary school education rather than post-secondary. There is a growing sophistication of students' environmental education prior to their entry to university and this, of course, will have significant implications for new and established university programs in sustainable development and environmental education in terms of both content and structure.

University teaching faculty rarely have any training at all in teaching or education skills and methods. And most university instructors who have not had previous experience in environmental studies/sciences programs are unfamiliar with interdisciplinary and environmental teaching techniques. There is a need for continuing in-service education for teachers themselves, particularly since the proliferation of environmental education courses and programs is not accompanied by a flurry of new faculty hiring.[28]

7. Outreach

Seeking solutions to practical environmental problems requires not only the development of applied knowledge and techniques but also practical action and involvement by the community. For example, environmental research and education is increasingly actively working with the community to identify research and taking it back to the community for feedback. This

community environmental development aspect of environment and sustainable development education is critical to the participatory, experiential learning mentioned above. In addition, university environmental education courses are in some cases moving out into the community, offering courses in smaller centres or to communities and populations that typically might not have the opportunity to enroll in university courses.

The issue of the university and its relationship to university teaching, research, community development and continuing education sectors is perhaps nowhere else so focused or problematic than in the area of environmental education. The very nature of environmental education requires not just the integration of teaching, research, and development from diverse bodies of knowledge and understanding, but also the integration of sectors and cross -fertilization between teaching, research, community development and continuing education within both Canada and the international community.

Education that is concerned with the scientific, social and political solutions of environmental problems is inevitably an ongoing process, with acquired information continually being updated and adjusted along with the constant change which the local and global environment is subject to. University environmental education must explore continuing education and ongoing professional training not only for environmental studies graduates who find employment in environmental fields, but for those professionals, bureaucrats, and business people who have never been exposed to environmental studies/science education and thus require upgrading.

One of the questions here is the degree to which university undergraduate and graduate environmental programs want to (or have the resources to) become involved in continuing education. But involvement with professionals who need environmental skills and knowledge upgrading could also be used to complement undergraduate education, provide networking opportunities and yet another means by which the community and issues of the "real world" can be brought into the university program to the benefit of both teaching and research.

Such linkages with professionals in the private and public sectors and local and international communities can also be a vehicle for greater interaction with those who hire students. Many educators in this area are concerned (as are their students) with employment prospects of students after graduation. Linkages with key organizations such as the Canadian Council for Human Resources in the Environmental Industry and the Canadian Environmental Industries Association are also important in this regard.

Outreach within the university is also very important. Environmental educators need to develop effective communication with other departments offering courses to environmental studies/sciences students; they need to talk to department heads and ensure understanding of and support for what they are trying to do. Much of the communication problems or lack of support may result simply from faculty not being aware of, or not having the information to understand, interdisciplinary education generally and environmental or sustainable development education specifically. The communication challenge also concerns the differences in philosophical and

research approach in various disciplines, as well as in terminology and concepts.[29] It is hard to talk about things like awareness, vision, empowerment, and the values which are central to the environmental studies and sustainable development fields when a shared language does not yet exist. It is also very rewarding, however, to find faculty across a university campus who do not use the same language but nevertheless share the same goal.

8. Resources

The high profile of environmental and sustainable development issues politically has translated into a certain amount of new money being injected into creating new programs and chairs in sustainable development or environmental studies/sciences. This new money, however, is not necessarily translatable into new courses, additional students, resources, lab space or meeting space for students, new faculty or faculty buy-out.

In addition, the administrative complexity of interdisciplinary programs does not necessarily translate into proportionately greater money. For example, in one case, the environmental department receives the same funds as all of the traditional departments yet because of the nature of its interdisciplinary programs and curricula, it must work with (and juggle) 21 different departments. When faculties are expected to develop interdisciplinary environmental programs with no more help financially than what is provided to disciplinary programs, much of the extra cost may be ultimately passed on to external and government funding agencies in terms of less productive research.[30]

In other cases, the allocation of scarce resources may create competitive strain because the interdisciplinary department or program may be growing at the expense of existing departments. Alternatively, in times of economic restraint, the experimental, new teaching programs may be the most potentially dispensable because the money will go to the core, established programs.

The lack of funds is also a frustration in giving students adequate technical training, for example, in laboratory experience. Resources in terms of space is also a problem for some of the very new programs; for example, lack of a common space for students to congregate can be problematic for environmental education since it may involve a lot of project and group work, or students coming together from different "homes" all over the university campus.

Conclusion

Environmental and sustainable development education at the university level in Canada has grown from the three programs that were established over 25 years ago, to at least four times that number in 1994. In the last three years alone, over 10 undergraduate programs in environmental studies or sciences have been established. Given their interdisciplinary and innovative nature, there is a need for those teaching in these areas to connect with colleagues at other Canadian institutions, to facilitate reaching common goals and to attempt to find solutions to shared obstacles. The workshop hosted by the NRTEE's Education Task Force went a long way toward

catalyzing the communication and networking of these programs so that the establishment of post-secondary education in the areas of the environment and the economy can proceed as efficiently and appropriately as possible. The issues highlighted in this paper are an introduction tothe state of university environmental education in Canada and a reflection of some of the needs.

Endnotes

1. World Commission on Environment and Development (1987) *Our Common Future*. Report of the World Commission on Environment and Development, Gro Harlem Brundtland (Chair), Oxford University Press, 113-114; UNCED (1992) *Agenda 21: The United Nations Programme of Action From Rio*, Chapter 36, Promoting Education, Awareness and Training.

2. Institutes and Centres Working in Sustainable Development, Environment, Economy, 24-25 March 1993 Workshop, National Round Table on the Environment and the Economy (NRTEE) and the International Institute for Sustainable Development (IISD).

3. Schneider, H., Vinke, J. and Weekes-Vagliani, W., (1993) *Environmental Education: An Approach to Sustainable Development*. Paris: OECD, 41.

4. OECD/CERI (1973) *Environmental Education at the University Level: Trends and Data.* Paris; OECD (1974) *Environmental Education at Post-Secondary Level Case Studies* compiled by the Centre for Education Research and Innovation (CERI); OECD (1976) *Environmental Problems and Higher Education.* Report of a Conference organized by CERI on Environmental Education at the Post-Secondary Level: Review of Experience-Future Action, at Rungsted Denmark, 4-7 June 1974.

5. Intergovernmental Conference on Environmental Education, Tblisi, USSR, 14-26 October 1977, in *Environmental Education in light of the Tblisi Conference* (1980). Paris: UNESCO.

6. Tblisi, 6.

7. Although these goals have been criticized as having been couched in too general terms and poorly operationalized: see Hungerford, H.R., Peyton, R.B. and R.J. Wilke (1983) "Yes, EE Does have Definition and Structure". *Journal of Environmental Education* 14(3)1-2.

8. UNESCO/IAU (1986) *Universities and Environmental Education.* Proceedings from a Seminar on the Role of the University in Environmental Education in Budapest 17-21 October 1983.

9. Clarke, H.J. (1992) *Creating a Common Future: Proceedings of the Conference on University Action for Sustainable Development.* Lester B. Pearson Institute for International Development, Dalhousie University, May 1992, 29; *Report and Declaration of the President's Conference; The Role of Universities and University Presidents in Environmental Management and Sustainable Development.* Talloires, France, Tufts University European Centre, 4-7 October 1990.

10. Clarke, 29.

11. The Role of Universities in a Sustainable Society. Proceedings from a Workshop held at the University of Guelph, 20-21 May 1992.

12. Open Letter dated 5 November 1993, inviting membership in the Environmental Studies Association of Canada (ESAC) whose organizing committee is based at York University. The role of ESAC is to provide a forum for discussion and exchange of information, establish networks, organize conference, and foster the development of environmental studies.

13. Changing Times, 1 (1) February 1994, Newsletter of the Canadian Counsil for Human resources in the Environment Industry, 700-2nd Avenue SW, Calgary, AB, T2P 3J4 fax: 403-269-9544.

14. Nova Scotia Round Table on Environment and Economy (February 1993) *Sustainable Development and the Environment: The Role of Formal Education*, Report of the Subcommittee on Environmental and Sustainable Education.

15. Nelson J.G. (1993) *Towards a sense of Civics: Sustainable Development, The Universities and Provincial Renewal.* For the Council of Ontario Universities and Provincial Renewal Conference, 7-9 November 1994, 34-35.

16. Jickling B. (1991) " Why I don't Want my Children to be Educated for Sustainable Development". *Journal of Environmental Education* 23 (4), 5-8.

17. Tbilisi, 27.

18. Thomas, I. (1991) "Yes, Vice-Chancellor: A Tale of the Academic Environment". *International Journal of Environmental Education & Information* 10(4) 183-202 at 184.

19. Robinson, J.B. (1991) "Falling Between Schools: Some Thoughts on the Theory and Practice of Interdisciplinarity" in Slater, L. and Hearne, A. *Outside the Lines: Exploring Interdisciplinary Research.* Toronto: McGill-Queen's Press

20. Mar, 650.

21. Robinson.

22. Howard Clark, President and Vice-Chancellor of Dalhousie University in opening address to the Halifax Conference on University Action for Sustainable Development in Clarke, H.J. (1992) *Creating a Common Future: Preceedings of the Conference on University Action for Sustainable Development.* Lester Pearson Institute for International Development, Dalhousie University, May 1992.

23. Jacobsen, S.K. (1991) " Education For Sustainablility" in Slocombe, D.S. (ed.) *Tools for Sustainability: Explorations and Prospects*, Proceedings of a Workshop held at Wilfird Laurier University, Waterloo, 7-8 October 1991, Sponsored by the International Union for Conservation of Nature and Natural Resources, 68. Also see note 19.

24.Page, B.(1992) "Canadian Universities and Environmental Issues" in Clark, H.J. (1992) *Creating a Common Future: Proceedings of the Conference on University Action for Sustainable Development.* Lester Pearson Institute for International Development, Dalhousie University, May 1992. Also see note 19.

25. Thomas, 201.

26. Stevenson, R.B. (1993) "Becoming Compatible: Curriculum and Environmental Thought". 24(2), 4-9.

27. Tbilisi Declaration states that the most important characteristic of environmental education is this approach to specific problem-solving (p.25).

28. Frien, J. (1991) "Accepting the Dual Challenge for Professional Development in Environmental Education". *Environmental Education and Information* 10(1), 1-17.

29. Jacobson, 68

30. Mar, B.W. , Newell, W.T. & B.O. Saxberg (1976) "Interdisciplinary Research in the University Setting". *Environmental Science & Technology* 10(7), 650-653 at 653.

Appendix I

PARTICIPANTS LIST
Post-Secondary Environmental and Sustainable Development Teaching Programs in Canada
February 11-12, 1994
Toronto, Ontario

David T. Brown
Institute of Urban & Environmental Studies
Faculty of Science
Brock University, 500 Glenridge
St. Catherines, Ontario
L2S 3A1
Tel: (905) 688-5550 ext. 3292
Fax: (905) 682-9020
E-Mail: dbrown@spartan.ac.brocku.ca

Raymond Côté
Director, School for Resource & Environmental Studies
Faculty of Management
Dalhousie University
1312 Robie Street
Halifax, Nova Scotia
B3H 3E2
Tel: (902) 494-3632
Fax: (902) 494-3728

Chad Day
Director, School of Resource and Environmental Management
Faculty of Applied Sciences
Simon Fraser University
Burnaby, British Columbia
V5A 1S6
Tel: (604) 299-4659
Home: (604) 299-8264
Fax: (604) 291-4968
E-Mail: runzer@sfu.ca

Jack Ellis
Associate Dean, Environmental Studies
York University
4700 Keele Street
North York, Ontario
M3J 1P3
Tel: (416) 736-5252
Fax: (416) 736-5679
E-Mail: dvjbell@yoru.vm2

Kathy Harrison
Coordinator Arts Stream
Environmental Studies/Sciences
C472 - 1866 Main Mall
University of British Columbia
Vancouver, British Columbia
V6T 1Z1
Tel: (604) 822-4922
Fax: (604) 822-5540
E-Mail: khar@unixg.ubc.ca

Magda Havas
Environment and Resource Studies
Trent University
Peterborough, Ontario
K9J 7B8
Tel: (705) 748-1261
Fax: (705) 748-1569
E-Mail: mhavas@trentu.ca

Fiona Heath
Environmental Studies Association
of Canada
355 Lumbers Building
York University
4700 Keele Street
North York, Ontario
M3J 1P3
Tel: (416) 736-5252
Fax: (416) 736-5679
E-Mail: esac_acee@orion.yorku.ca

Stuart Hill
Professor, Faculty of Agricultural and
Environmental Sciences
McGill University
Macdonald Campus, 21111 Lakeshore Road
Ste. Anne de Bellevue, Quebec
H9X 3V9
Tel: (514) 398-7909
Fax: (514) 398-7990
E-Mail: cxhl@musica.mcgill.ca

Gary Hunt
Natural Resource Science
University College of the Cariboo
Box 3010
Kamloops, British Columbia
V2C 5N3
Tel: (604) 828-5467
Fax: (604) 828-5450
E-Mail: gahunt@cariboo.bc.ca

Bob Jickling
Outdoor and Environmental Studies
Academic Studies Division
Yukon College
P.O. Box 2799
Whitehorse, Yukon Territory
Y1A 5K4
Tel: (403) 668-8778
Fax: (403) 668-8828

Pavlos Kanaroglou
Geography Department
McMaster University
1280 Main Street West
Hamilton, Ontario
L8S 4L8
Tel: (905) 525-9140 ext. 23525
Fax: (905) 546-0463
E-Mail: pavlos@mcmaster.ca

Doug McKenzie-Mohr
Professor, Psychology Department
St. Thomas University
Fredericton, New Brunswick
E3B 5G3
Tel: (506) 452-7700
Fax: (506) 450-9615
E-Mail: mckenzie@stthomasu.ca

Gray Merriam
Director, Environment Policy Institute
Carleton University
1125 Colonel By Dr.
Ottawa, Ontario
K1S 5B6
Tel: (613) 788-3859
Fax: (613) 788-4497
E-Mail: gmerriam@ccs.carleton.ca

Michael Moss
Associate Dean, Faculty of Environmental
Sciences
University of Guelph
Guelph, Ontario
N1G 2W1
Tel: (519) 824-4120
Fax: (519) 763-4686
E-Mail: mike@envsci.uoguelph.ca

Leone Pippard
President and Executive Director
Canadian Ecology Advocates and
NRTEE Member
20, rue de l'Église
St-Jean, Ile d'Orléans
Québec G0A 3W0
Tel: (418) 829-1145
Fax: (418) 829-1276

Gordon Robinson
Coordinator, Environmental Sciences
Faculty of Science
University of Manitoba
Winnipeg, Manitoba
R3T 2N2
Tel: (204) 474-9897
Fax: (204) 275-3147
E-Mail: ggrobin@ccu.umanitoba.ca

John Robinson
Director and Professor of Geography
Sustainable Development Research Institute
University of British Columbia
B5 - 2202 Main Mall
Vancouver, British Columbia
V6T 1Z4
Tel: (604) 822-8198
Fax: (604) 822-9191
E-Mail: robinson@bcu.ubc.ca

Bill Ross
Professor, Environmental Science Program
Faculty of Environmental Design
The University of Calgary
2500 University Dr. NW
Calgary, Alberta T1K 1N4
Tel: (403) 220-6961
Fax: (403) 284-4399
E-Mail: bill@evds.ucalgary.ca

Gerald B. Ward
Chairman, Environmental Science
Faculty of Engineering
University of New Brunswick
P.O. Box 4400
Fredericton, New Brunswick
E3B 5A3
Tel: (506) 453-4570
Fax: (506) 453-3568

Ann Zimmerman
Director, Division of the Environment
Faculty of Arts & Sciences
University of Toronto
25 Harbord Street
Toronto, Ontario M5S 1A1
Tel: (416) 978-3475
Fax: (416) 978-8532
E-Mail: annez@zoo.utoronto.ca

NRTEE Secretariat:
Carla Doucet
Policy Advisor, Education
NRTEE
1 Nicholas St., Suite 1500
Ottawa, Ontario K1N 7B7
Tel: (613) 947-0668
Fax: (613) 992-7385
E-Mail: nrtee@web.apc.org or
cdoucet@nrtee-trnee.ca

Statement of Common Principles for Interdisciplinary Environmental and Sustainable Development Education and Research Programs in Post-Secondary Institutions

(First Draft)

Humans are confronted with a wide range of interrelated environmental problems on a planetary scale. We have passed the stage of simply raising awareness about these problems, and must now move into a new phase of issue-oriented critical analysis of the causes of the problems and action to solve them. Post-secondary institutions can address these problems through teaching, research, and linkages with the local and global communities.

Finding solutions to the pervasive and accelerating deterioration of our environment. The common objective, interdisciplinary approaches which bridge the natural sciences, the social sciences, the humanities and professions such as law, medicine and engineering. It requires people who can combine specialized knowledge with a generalized understanding of the complexity and interrelatedness of environmental issues.

There are many effective models for post-secondary programs on the environment. The common objective of our interdisciplinary programs is to provide students with knowledge about environmental issues and problems, and the skill to use that knowledge in ways that contribute to increasing the integrity of life-support systems.

Common principles of our programs include:

1. affirmation of the traditional educational goals of literacy, numeracy, depth and breadth of understanding; and
2. the nurturing of an attitude of respect and openness towards the intellectual contributions of others and towards nature;
3. emphasis upon making active connections, both within the university and beyond the university, which result in progress towards our goal of increasing the integrity of the planet. These connections might be with other academic units, or with individuals and agencies in municipalities, government ministries, or local, national or international organizations;
4. avoidance of the entrenching of a certain subset of knowledge or skills as being "environmental"; in other words, to allow the issue or problem at hand to define the disciplinary expertise which must be brought to bear. Having students gain experience with interdisciplinary approaches to problem solving is a core pedagogical approach realized through practicums, field placements, group work, etc. This implies flexible, dynamic, and adaptable academic units, and mitigates against an excessively vertical or hierarchical institutional arrangement;
5. affirmation of the need and desire to work in close cooperation with traditional areas of specialization and disciplinary endeavour, without compromising an interdisciplinary orientation.

Sustainable Development
Institutes Workshop Summary
March 24 - 25, 1993

Introduction

A workshop bringing together post-secondary institutes of sustainable development was held in Ottawa March 24 and 25, 1993, co-chaired by the National Round Table on the Environment and Economy's Task Force on Education and the International Institute for Sustainable Development. Eleven institutes of sustainable development and two representatives from the funding councils attended the one and a half day workshop. A list of participants is attached as Appendix A.

The purpose of the workshop was to engage the sustainable development academic community in identifying and prioritizing the strategic research issues facing post-secondary institutions in the implementation of sustainable development, and Canada's international commitments under Agenda 21.

The objectives of the workshop were;

1. to catalyze a strategic partnership between the various post-secondary institutes and centres working in sustainable development;
2. to identify the research priorities for sustainable development research in Canada; and
3. to identify the key questions for decision makers.

Background

The challenges faced by sustainable development research are only one dimension of a larger set of environmental and social challenges now facing human societies. The societal developments linking the environment and the economy at both the domestic and international policy levels over the last few years have been accompanied by the increasing recognition of the value, indeed the necessity, for interdisciplinary research. If Canada's relatively young sustainable development research institutes are charting a new course in interdisciplinary research and collaboration, they must also lead the way in new approaches and methodologies for academic research. This may require an entirely new process and organization for the way research is conceptualized, conducted, funded, monitored, reported and ultimately used, given that the past research methods have been constrained by the traditional disciplinary approaches from which they emerged.

This traditional separation of disciplines in academia has been accompanied by a belief in the necessary separation of science (including all academic research from politics and public policy). The assumption has typically been that academic research should be disinterested and neutral. But the relationship between science and policy is often characterized by problems of misunderstanding and mistrust between scientists and decision makers and the concerns of scientists about the apparent tendency for science to become increasingly influenced by external factors such as political utility or timeliness, instead of the traditional internal criteria of scientific quality and intrinsic scientific interest. However, contrary to the prevalent view in the scientific community, the misuse of research and science should not be seen as the fault of ill-informed policy makers

who misrepresent the meaning of the analyses and research presented to them. Rather, one could argue that while research is often used for purely legitimizing purposes, this may be due in part to the content and form of the information received from the academic community. And science itself could be said to be strongly affected by the policy context in which it is undertaken. This goes beyond the argument that the research agenda may be influenced by funders and extends to the argument that independent of intent, results of scientific research reflect certain normative assumptions and judgments in and of themselves. The burden should not only be on policy makers to learn science, but also on academic researchers to be aware that research is value laden and that they should perhaps take responsibility for the normative aspects of their work.

Workshop Summary

Following an initial discussion by the participants on the activities and structures of their respective Institutes, discussion centred around some of the common opportunities and challenges shared by the various Institutes. The remainder of the workshop was devoted to identifying strategic research priorities; discussing some of the obstacles to sustainable development research; the role of Institutes and university research; and the relationship between research and policy.

Priorities

The workshop helped to further catalyze the participant Institutes in their attempt to move into this new world of sustainable development research which represents an entirely new approach both to university research and to what has been traditional environmental research. Sustainable development research by necessity is broader, and more integrative than environmental studies, and therefore, has a completely different orientation to the research agenda. The discussion around research priorities amongst the Institutes made this new approach very clear, and the set of themes which emerged illustrated that this revolutionary approach to university research which has three important characteristics: it was applied research; it was policy relevant; and it involved new strategic partnerships and stakeholder processes.

The Institute directors identified strategic sustainable development research issues which they felt to be key priorities for the decade and these are listed in Appendix B. They decided against prioritizing the issues or developing a common framework at this point, in order to maximize the limited workshop time available. These individual topics could be roughly grouped into the following categories which are presented here for summation purposes only.

One theme which emerged was that of the integration of environment and economy within the broader context of social sciences and humanities; linking ecological realities with the broader economic and human spheres within which our societies operate. A second theme was growth and the linkage of ecological constraints with development imperatives, resolving the apparent contradiction between them. Third, there should be explicit attention to the way research is produced and used; that is, there is a need for research to make a difference in the world. A fourth theme had to do with restructuring institutions, and particularly important example in this context is the reform of universities so that more of this multidisciplinary and applied, policy-relevant research happens. Fifth was the relationship between global interdependence and local self-reliance which includes, for example, biodiversity, carrying capacity, and issues of resource management. Sixth, was the nature of development imperatives, including the distributional effects of sustainable development. A seventh theme was the processes for social change.

The discussion around obstacles to sustainable development research included institutional barriers, such as administrative structures; the adherence to disciplines; lack of communication, and the incentive system for promotion and publishing constraints. A list of the obstacles discussed is attached as Appendix C.

The participants were unanimous in their praise of Tri-Council eco-research funding; it has played a very important role in stimulating research in this area and giving a signal that this type of research is valued, since traditionally it has been very hard to get funding for multidisciplinary projects. But even if unlimited money were available, there is nevertheless a great deal of pain, effort and frustration that goes into a proposal. This is particularly the case in sustainable development research because one has to talk to researchers in other to disciplines who often do not speak the same language, use very different methods, and have different ideas of what good research is. Different disciplines not only confuse each other with their own terms but may use the same terms understood in an entirely different context. Given the difficulty of preparing the project proposals for Tri-Council funding, the recent cutbacks will result in a much lower success rate for acceptance, and many researchers may simply elect in the future to go the safe route and continue with traditional research.

Within the universities, the big obstacle is the lack of institutional support which is not restricted to money, but also includes the reward and incentive system. The incentives just do not exist, for junior faculty in particular, to undertake "risky" research, and the reward system is stacked against them due to the need to publish in disciplinary journals. There were faculty disincentives and indeed, insecurity about getting involved in sustainable development research because it is seen as inherently different and risky, given the low value placed on this kind of research both by their peers and some university administrations.

Role of Research

Discussion ensued around who and what sustainable development research was for, and whether research in this area was reactive or proactive in terms of societal developments. Some felt that the role of the Institutes was to help policy makers and policy planners. Others felt that the first focus for research should be business and industry, since that was where implementation was actually taking place; that research should focus on questions that directly impacted on society. There was some discussion about whether the role of researchers was simply to provide policy makers with research results. Others suggested that academics give policy makers research results as well as policy analysis; and that advice was quite different from analysis. However, advocacy research was becoming much more accepted and conducted more often, as opposed to the simple provision of information and analysis. Analytical research and advocacy research did not need to be mutually exclusive within Institutes; there was a need to produce different kinds of research geared to the particular needs of the audiences.

Perhaps the focus should be on *how* the research information was used, and how it influenced decision makers, regardless of the intended audience. For example, there was some concern about research contracts with governments which then used the data to their own ends, filter, or withhold information. Perhaps the links, and lack thereof, between government, industry and academia needed to be reconsidered and different kinds of relationships formed here and also between academic and the public community at large.

Because sustainable development was still at the ideological stage, researchers should therefore be questioning sustainable development both intellectually and theoretically and communicating this in their partnerships with other sectors. That is, sustainable development research was unique in that it was self-referencing; researchers had to be both aware of the process of research and, at the same time, consider the policy implications. By definition, everything the institutes were involved in, necessarily related to the process as well as the substance of sustainable development principles.

Further Action

There was unanimous agreement to form the Canadian Centres for Sustainable Development Research and to continue meet to further refine strategic research priorities in Canada.

The purpose of the Group would be:

1. to continue the collaboration between post-secondary sustainable development institutes;

2. to promote the necessity for basic ecosystem research within the university administrations and the wider community and to increase the incentives and funding for such research;

3. to foster links and greater collaboration with government, industry and non-government organizations;

4. to advance the work of researchers currently working on interdisciplinary and ecosystem research, wherever possible; and

Participants agreed that the Sustainable Development Research Institute at the University of British Columbia should take the lead in the further organization of the Group.

PARTICIPANTS LIST
Institutes and Centres Working in Sustainable Development, Environment, Environment/economy
March 24-25, 1993 Workshop

Fikret Berkes
Director
Natural Resources Institute
University of Manitoba
430 Dysart Road
Winnipeg, Manitoba
R3T 2N2
(204) 474-8373
(204) 261-0038 fax

Brian Bornhold (Friday, March 25, 1993)
David Henderson (Thursday, March 24, 1993)
Canadian Global Change Program
Royal Society of Canada
355 River Road, Tower B
16th floor
Ottawa, Ontario
K1L 8C1
(613) 991-5639
(613) 991-6996 fax

Michel T. Cescas
Studies and Research Centre on Environmental Policies
Laval University
Pavillon Paul Comtois
Sainte-Foy, Québec
G1K 7P4
(418) 656-2993
(418) 656-3723 fax

Philippe Crabbé
Director
Institute for Research on the Environment and Economy
University of Ottawa
5 Calixa Lavallée
Ottawa, Ontario
K1N 6N5
(613) 564-7644
(613) 564-6716 fax

Terence Day
Director
Atlantic Canada Centre for Environmental Science
Saint Mary's University
Halifax, Nova Scotia
B3H 3C3
(902) 420-5197
(902) 420-5261 fax

Art Hanson
President and Chief Executive Officer
International Institute for Sustainable Development
212 McDermot Avenue
Winnipeg, Manitoba
R3B 0Y4
(204) 958-7700
(204) 958-7710 fax

Stephen Lonergan
The Centre for Sustainable Regional Development
University of Victoria
3771-A Haro Road
Victoria, British Columbia
V8P 5C3
(604) 721-8782
(604) 721-2513 fax

Colleen Mercer-Clarke
Executive Director
Nova Scotia Centre for Environmentally Sustainable Economic Development
Dalhousie University
1334 Barrington Street
Halifax, Nova Scotia
B3J 2X4
(902) 420-7936
(902) 429-4866 fax

Tom Meredith
Director
Environmental Studies Program
McGill University
Burnside Hall
805 Sherbrooke Street West
Montreal, Quebec
H3A 2K6
(514) 398-4111
(514) 398-7437 fax

John Middleton
Director Institute of Urban and Environmental Studies
Brock Unsiversity Merrittville Hwy.
St. Catherines, Ontario
L2S 3A1
(416) 688-5550 ext 3292
(416) 682-9020 fax

John Pierce
Chair of Geography & Director of CEDC
Simon Fraser University
Burnaby, British Columbia
V5A 1S6
(604) 291-3321
(604) 291-5841 fax

Leone Pippard
President and Executive Director
Canadian Ecology Advocates
20, rue de l'Église
St-Jean, Ile d'Orléans
Québec
G0A 3W0
(418) 829-1145
(418) 829-1276 fax

Henry Regier
Director
Institute of Environmental Studies
University of Toronto
170 College Street
Toronto, Ontario
M5S 1A4
(416) 978-4596
(416) 978-3884 fax

John Robinson
Director
Sustainable Development Research Institute
University of British Columbia
B5 - 2202 Main Mall
Vancouver, British Columbia
V6T 1Z4
(604) 822-8198
(604) 822-9191 fax

NRTEE Secretariat:
Ann Dale
Director
of Operations
Carla Doucet
Policy Advisor, Education
NRTEE
1 Nicholas Street, Suite 1500
Ottawa, Ontario K1N 7B7
Tel: (613) 947-0668
Fax: (613) 992-7385